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Dated: November 12, 2003

Signature: 
(Richard Zimmermann)

Docket No.: 30140/10000A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
APPLICATION FOR UNITED STATES LETTERS PATENT

Title:

FIRE RESISTANT CONNECTION HOUSING AND A METHOD OF
CONSTRUCTING A FIRE RESISTANT CONNECTION HOUSING

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**FIRE RESISTANT CONNECTION HOUSING AND A METHOD OF
CONSTRUCTING A FIRE RESISTANT CONNECTION HOUSING**

[0001] This patent is a Continuation-in-Part of United States Patent Application Serial No. 09/918,344, filed on July 30, 2003 and entitled "Gas Connection Housing and A Method of Constructing A Gas Connection Housing" the disclosure of which is hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates generally to enclosures for receiving gas line connections and more specifically to an enclosure for installation within a wall and supporting a gas line connection within a wall.

BACKGROUND

[0003] In residential and/or commercial construction, appliances such as washers, dryers, hot water heaters, furnaces, stoves, gas grills etc., all require connection to one or more utilities, such as electricity, water, and/or gas in order to function. Convenient electrical connections are very well known. However, connections for water and gas lines are more problematic. Typically, gas and water lines are located within the walls or under the floors of a building, with appropriate sealed connections provided to the appliance at the point of use. The gas or water line typically protrudes from the wall or from the floor adjacent to or behind the location of the appliance.

[0004] Housings for water line connections are known. Such known housings typically place at least a portion of the water line connection behind the plane of the wall, allowing water using appliances (e.g., washers, refrigerators, or water coolers) to be positioned closer to the wall, to better utilize the available floor space. Such known housings are typically mounted to the wall studs after cutting a hole in the drywall, such that a face of the housing is roughly flush with the surface of the

wall. A drainage connection may also be provided in such housings, with flexible water lines routing water to and from the appliance as needed.

[0005] For appliances requiring natural gas connections, the gas supply lines are also routed through the wall as described above. Unlike water lines, gas supply lines require heavier gauge piping, typically rigid piping commonly referred to as "black pipe." Gas supply lines also require much more secure connections, and require a shut-off valve at the terminus of the rigid piping to prevent the leakage of combustible gases. A typical gas supply line connection positioned outside of the plane of the wall is shown in Figs. 1 and 2.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Fig. 1 is a perspective view of a prior art gas supply connector disposed outside of the plane of a wall;

[0007] Fig. 2 is a plan view of the prior art gas supply connector illustrated in Fig 1;

[0008] Fig. 3 is a front elevational view of a gas connection housing constructed in accordance with the teaching of the present invention;

[0009] Fig. 4 is a perspective view of the housing illustrated in Fig. 3;

[0010] Fig. 5 is a cross-sectional view taken along line 5-5 of Fig. 3;

[0011] Fig. 6 is a cross-sectional view similar to Fig. 5;

[0012] Fig. 7 is a cross-sectional view similar to Fig. 6 taken along the line 7-7 of Fig. 4 but showing a gas connection housing constructed in accordance with a second disclosed embodiment of the present invention;

[0013] Fig. 8 is a plan view of an unassembled gas connection housing; and

[0014] Fig. 9 is a perspective view of a gas connector housing disposed within the plane of an exterior wall.

DETAILED DESCRIPTION

[0015] The following description of the disclosed embodiment is not intended to limit the scope of the invention to the precise form or forms detailed herein. Instead, the following description is intended to be illustrative of the principles of the invention so that others may follow its teachings.

[0016] Referring now to the drawings, Fig. 3 illustrates a gas connection housing generally referred to by the reference numeral 10. The housing 10 may be constructed from a variety of materials including, but not limited to, sheet metal, ceramic or plastic, while the embodiments discussed herein are primarily constructed of sheet metal. For reasons of manufacturability, these embodiments are intended to be illustrative only and not to limit the invention to any specific material. For ease of illustration, one possible intended use is illustrated in Fig. 5 in which the housing 10 is positioned behind a plane 12 defined by a surface of a wall 14. As shown therein, the housing 10 is permanently attached to a pair of wall studs 16a and 16b by a plurality of attachment members 18. Alternatively, the housing 10 may be provided with a peripheral flange (not shown) to aid in the attachment process.

[0017] The housing 10 includes a back wall 20 and a plurality of side wall 22a, 22b, 22c and 22d. As illustrated in Fig. 4 the side walls 22a and 22b meet along a common seam 23a, the sidewalls 22b and 22c meet along a common seam 23b, the sidewalls 22c and 22d meet along a common seam 23c, and the sidewalls 22d and 22a meet along a common seam 23d. The back wall 20 meets each of the sidewalls 22a-22d along a common seam 25. Preferably, the seams 23a-23d and 25 are all impermeable or are otherwise sealed. Thus, the back wall 20 and the side walls 22a, 22b, 22c, 22d together form a sealed enclosure 24 having an open face 27.

[0018] At least one of the sidewalls 22a-22d includes an orifice 26 sized to accept a pipe section 28 (illustrated in detail in Fig. 3). The pipe

section 28 is connected to the gas valve 34, and the gas valve 34 and the pipe section 28 are secured to the side wall 22a using a collar or other suitable connection hardware. The pipe section 28 includes an end 29 that is adapted for connection to a gas supply line (not shown). The orifice 26 may further include a gas impermeable sealing member 30 (illustrated in detail in Fig. 6). Thus, the gas supply line 28 may be fixedly attached to the side wall 22a so as to extend through the orifice 26. The gas supply line 28 may be secured to the side wall 22a by a conventional threaded collar 32.

[0019] It will be understood that the gas supply line 28 may, as an alternative, extend in a similar manner through an orifice formed in any one of the side walls 22b, 22c, 22d, or, as a still further alternative, through a similar orifice formed in the back wall 20 of the housing 10. The housing 10 may be sized so that a gas valve 34, illustrated in Figs. 3 and 5, may be mounted within the enclosure 24. The gas valve 34 provides a connection for a utility supply line 36.

[0020] The enclosure 24 includes an interior surface 38 and an exterior surface 39, which, in accordance with the first disclosed embodiment, includes a coating 40 of a fire retardant material as illustrated in Figs. 5 and 6. The fire retardant material may be, by way of example rather than limitation, an intumescent material applied to either the interior surface 38, the exterior surface 39, or both the interior surface 38 and the exterior surface 39 of the enclosure 24. One possible intumescent material may be A/D Firefilm II® brand name, available from AD Fire Protection Systems.

[0021] It will be understood that the enclosure 24 can be used to support, protect and route virtually any flammable material. For example, the coating 40 of fire retardant material may be selected to contain and insulate against electrical fire caused by possible combustion within the enclosure 24. In an alternate embodiment, the enclosure 24 can be configured as an electrical connection box including, for example, terminal

blocks, electrical panels, and electrical transmission wires or cables having a termination portion and/or a connector portion wherein the transmission wires may be routed and supported using strain reliefs. In this configuration, the interior surface 38 and exterior surface 39 may be coated with an insulating material which can be intumescent material, to contain and control the transmission member (e.g. the wire or cable).

[0022] In operation, and referring to Fig. 8, the housing 10 may be formed from a section of precut sheet metal stock or other suitable material. The housing 10 may be formed by folding sidewalls 22a-22d along the seam 25. The sidewall 22a includes a pair of edges 21a, 21h. Similarly, the sidewall 22b includes a pair of edges 21b, 21c, the sidewall 22c includes a pair of edges 21d, 21e, and the sidewall 22d includes a pair of edges 21f and 21g. Upon folding of the sidewalls 22a-22d along the seam 25, the edges 21a, 21b, 21c, 21d, 21e, 21f, 21g, and 21h are brought into contact with their respective adjacent edges to form the seams 23a-23d, respectively. The seams 23a-23d may then be sealed by any suitable technique, such as by welding, gluing, or using any other means of fastening.

[0023] As an alternative, the housing 10 may be stamped using conventional sheet metal forming techniques and may include a plurality of tabs (not shown) integral, by way of example, to the edges 21a, 21c, 21e and 21h and folded to engage a corresponding one of the adjacent sidewalls 22a-22d to form the seams 23a-23d which are preferably sealed as described above. The coating 40 may then be applied, preferably after forming the housing 10. The coating 40 may be sprayed on, or the housing 10 may be dipped. Other application techniques may be used as well.

[0024] Referring now to Fig. 9, the housing 10 is shown recessed in an exterior wall 12a. When so employed, the housing 10 permits the connection of an outdoor appliance such as a gas grill or gas heater to the exterior of the structure. The utility supply line 36 may be accomplished

in a manner similar to the connections described above, or in the alternative, the utility supply line 36 may be made using a flexible piping system (not shown). One possible flexible piping system, made by Titeflex Corporation is available under the brand name Gastite®.

[0025] Another embodiment is illustrated in Fig. 7, which depicts the housing 110 formed from a ceramic material 42. The housing 110 is similar in all other respects to the housing 10 discussed above. The ceramic material 42 chosen for the construction of the housing 110 may be capable of withstanding heat without the application of additional fire retardant materials.

[0026] The use of ceramic may offer certain advantages, including, by way of example rather than limitation, a reduction in the overall weight of the housing 110, which in turn makes the housing 110 easier to handle and install. In addition, when the housing 110 is formed from a ceramic material 42, the device may offer increased thermal and electrical insulating properties. The housing 110 may, as an option, also include a coating 40 as outlined above.

[0027] In use, when the thermal insulating and fire resistant or retardant materials are combined in the formation of a sealed enclosure, and with the addition of the gas impermeable sealing member 30, escaping gases may be effectively prevented from communicating beyond the confines of the enclosure. As a result, escaping gases may be effectively prevented from entering and being trapped behind the plane of the wall. This result may be highly desirable when dealing with a highly flammable substance such as, for example, natural gas, propane, etc.

[0028] Incorporating an intumescent material into the basic design of the housing 10 or 110 may offer a number of advantages, including, among other things, enhanced fire protection characteristics. When an intumescent coating is exposed to extreme heat, the coating expands to many times its original volume, thus creating a rigid foam. The inert gases trapped within the foam act as a highly efficient insulator to protect

the structural integrity of the housing 10, 110 for a period of time. In the disclosed embodiment, the intumescent coating 40 may offer, for example, up to three hours of fire protection, in compliance with CAN/ULC-S101 and ASTM-E119 standards.

[0029] While the housings have been described herein with reference to specific examples, which are intended to be illustrative only and not to be limiting of the invention, it will be apparent to those of ordinary skill in the art that changes, additions or deletions may be made to the disclosed embodiments without departing from the spirit and scope of the invention. Further embodiments may include, for example, audio-visual control enclosures, routing and relay enclosures, computer networking enclosures, and alarm enclosures.